SIR ROBERT PEEL'S NEW GALLERY AT DRAYTON MANOR.

The new picture gallery, of which we gave a view some time ago,* is now finished. It is attached to the south-east angle of the mansion, and forms a wing 100 feet long in extension of the north front. The exterior is built of stone from Hollington. The style of architecture is that which prevailed during the latter part of Queen Elizabeth's reign, and that of James I. An arcade extends along all three sides, surmounted by an entablature, with an attic, upon which are small carved pinnacles breaking the outline of the building. The exterior is further decorated by four stone statues, somewhat larger than life; the two towards the south, or garden front, representing Rubens and Vandyke, and the two towards the north representing Reynolds and Lawrence. There are no windows, but a glazed sash door at the south-western extremity, which leads on to a new terrace, about 160 feet long and 19 feet wide, decorated with a stone balustrade, vases, pedestals, &c. This terrace joins on to other terraces surrounding three sides of the mansion, embellished with a profusion of marble and stone vases. Within, the ceiling is of various shades of oak and walnut-tree wood. The walls are painted of a strong greenish neutral colour; the skirtings are of wainscot. The floor is bordered with an inlaid band of a scroll pattern, consisting of oak, walnut-tree, and ebony woods. The columns and pilasters, seen in our engraving, are of marble. The capitals and bases are of white veined Italian marble; the shafts are each of a single block of Belgian marble, of variegated colours, chiefly of reddish hues, intermixed with white. The pedestals on which they stand are panelled, and composed of the same marbles.

QUESTION AS TO THE STRENGTH OF CAST-IRON.

Sir,—If any of your correspondents, whose experience qualifies them for the task, would favour your readers with their opinions upon the following questions, probably the information would be felt of value by others, as well as by your obedient servant,

Islington. G. M.

Suppose I wish to settle the scantlings of some iron castings, such as girders, pillars, &c.; and suppose that, with the intention of resting my case upon the best and soundest authority, I consult Tredgold's well-known Essay on Cast-iron, in which I find some beautiful theories of the action of forces upon materials, joined to what the author seems to have considered sufficiently sound data for the strength of the particular material, cast-iron. But, suppose my copy of the book is one of the fourth edition (edited by Mr. E. Hodgkinson, 1842), in which I find, in the editor's notes, some slur cast upon Tredgold's accuracy, principally as regards the varying strength of iron of different manufactures, of which many sorts are said to be very much below the author's assumed average:—

Now I wish to ascertain whether, if my girders, &c., are procured from manufacturers of established credit and respectability, in London or elsewhere, they may not be calculated to possess the degree of strength, at elastic limits, which is assumed in Tredgold's formulæ? If not, what may be expected to happen to the numerous buildings in which cast-iron supports have been used, but which have been erected previously to the recent researches of Mr. Hodgkinson and Mr. Fairbairn? I have not yet procured a detailed copy of these: when I do, shall I have to unlearn Tredgold's beautiful system of calculating pillars and struts, or shall I only be obliged to modify his constants, to suit another scale of strength?

Club Competition.—We understand that the members of the Army and Navy Club have purchased a large space of ground adjoining their old house of meeting in St. James's-square, with the view of erecting a building which shall take rank among the architectural ornaments of the metropolis. For this purpose, according to the *Athenæum*, it is their intention to offer two prizes, of 200*l.* and 100*l.* each, for the first and second best plans of such a building, and to open the competition to the members of the architectural profession at large.

* See Vol. III., p. 221.

CHINESE ARCHITECTURE.

Mr. Montgomery Martin, in his recent work on China, says—"The northern divisinn of *Peking* consists of three inclosures, one within another, each surrounded by its own wall. The first inclosure ('forbidden city') is the most splendid and important part of Peking. It is situated nearly in the centre of the northern division of the city. It is an oblong parallelogram about two miles in circumference, and inclosed by a wall nearly 30 feet high. This wall is built of polished red brick, surrounded by a ditch lined with hewn stone, and covered with varnished tiles of a brilliant yellow, which give it the appearance, when seen under the rays of the sun, of being covered with a roof of gold. The interior of this inclosure is occupied by a suite of courtyards and apartments, which, it is said, for beauty and splendour, cannot be surpassed. It is divided into three parts—the eastern, middle, and western. The Gate of Peace has five avenues, and is a superb building of white marble. The height of the basement is 20 feet, and the whole edifice 110. The ascent to it is by five flights of forty steps each, and it is highly ornamented with tripods and other figures in bronze.

Suchaw, two days distant from the sea, accessible only by inland water communication, has a high reputation in every part of China for its splendid marble buildings, the elegance of its tombs, the number of its granite bridges, and artificial canals, gardens, streets, and quays. Indeed, there are several towns included in one, comprising what is called Suchaw. The city proper is inclosed with high walls, which are about ten miles in circumference: the suburbs are four distinct towns, about ten miles in length, and nearly the same in breadth.

PROTECTION OF BUILDINGS FROM LIGHTNING.

SOCIETY OF ARTS.

In a paper by Mr. Highton on the effects of heavy discharges of atmospheric electricity, as exemplified in the storms of 1846 (including an account of the destruction of St. George's Church at Leicester on the 1st of August), with remarks on the use and application of lightning conductors, read at the last meeting of the Society of Arts, the author proceeded to compare the power developed in the discharge of the lightning which destroyed this church, with some known mechanical force. He stated that 100 tons of stone were blown down a distance of 30 feet in three seconds; and, consequently, a 12,220 horse-power engine would have been required to resist the efforts of this single flash. He exhibited the effects of a new battery constructed by himself, and which was less than the $\frac{1}{40}$ of a cubic inch in size. This battery he had found would, for a month together, ring a telegraphic bell ten miles off. He also exhibited a second battery, which, although so small that it would pass through the eye of a needle, is of power sufficient to work a telegraph. Having detailed the course of several discharges of atmospheric electricity, he proceeded to shew the effects produced on the electric telegraphs, and the means which have since been adopted to prevent injury to them in future. He stated that, since the occurrence of the above storms, he had examined the Cathedral of St. Paul, in London, to ascertain how far this noble pile of building is protected from the effects of lightning. He found that the two small turrets have lightning conductors erected, but the central dome has none. The position of the spouts and other metallic connections is, however, such, that he considers, if the same are preserved as they now are, the building will for years to come be free from damage by lightning; but should they be removed at any time, and glass or porcelain employed in their stead, the main part of the building would be in constant danger from every storm that passes over the city. He concluded by urging the importance of a correct and systematic principle being acted on in the new Houses of Parliament, with a view to securing them from the disastrous effects of lightning.

A pier half a mile long is to be built at St. Helier's, Jersey, with other works, for all of which contracts have been advertised for.

New Books.

Turning and Mechanical Manipulation. Intended as a Work of Practical Instruction on the Lathe, and the Various Mechanical Pursuits followed by Amateurs. By Chas. Holtzapffel, Associate of Institution of Civil Engineers (64, Charing-cross). 1846.

This is the second volume of eight contemplated by Mr. Holtzapffel, and is entitled to the strongest recommendation we can give it, as a sound and sterling work,—the result of personal experience, careful calculation, and great ingenuity. The first volume treated of materials, their differences and preparation, and the various modes of working them, generally without cutting tools. The volume before us treats of the principles of construction, action, and application; of cutting tools used by hand, and also of the machines derived from the hand tools, and embraces chisels and planes, turning tools, boring tools, screw-cutting tools, saws, files, shears,—and has a number of valuable notes in the shape of an appendix. The author says:—"The chisel was selected as the subject of the first chapter, as, from the simplicity of its form and action, it may be viewed as a keen wedge—sometimes employed with quiet pressure, at other times used with percussion, as in tools of the character of axes and adzes; and the straight chisel, mounted in a stock for its guidance, becomes a plane. Further, the chisel may be used as a turning tool; and many tools of this kind (the second in classification) follow the conditions of chisels and planes, if we imagine the tool to be held at rest, and the work to revolve against it on a fixed axis; the practice of turning is naturally associated with that of boring holes, although, in most cases, the boring tool revolves, whilst the work remains at rest. Turning and boring, each circulatory processes, led to the selection of the screw as the subject of the next chapter—for revolution, combined with rectilinear advance, are exhibited in all the numerous modes of producing screws. Saws were ideally compared with some of the scraping chisels, but with a multiplication of points, and these sometimes arranged in continuous order, as in the circular saw. The file, from its vast assemblage of scraping teeth, was likened to a multiplication of the saw. Shears and punches are next considered, in great measure, as parallel chisels, and the rectilinear edges of shears, although mostly duplicated, bear some resemblance to simple chisels—although, from their duplication, they act on both sides of the material; and, lastly, the ordinary punch is comparable with the rectilinear edges of the shears and chisels, if we do but consider these to be bent into the circular form."

All are treated in the clearest and most philosophical manner.

As a specimen of the style in which the work is written, we quote the following remarks on

METAL TURNING.

"The softest of the metals, such as lead, tin, and soft pewter, may be turned with the ordinary tools for soft wood; but for the harder metals, such as zinc, and hard alloys containing much antimony, the tools resemble those used for the hard woods, and they are mostly employed dry.

Copper, which is much harder and tougher, is turned with tools similar to those for wrought-iron, but in general they are sharpened a little more keenly, and water is allowed to drop upon the work, to lessen the risk of *dragging* or tearing up the face of the copper, a metal that neither admits of being turned or filed with the ordinary facility of most others. Silver and gold, having the tenacious character of copper, require similar turning tools, and they are generally lubricated with milk.

In the above, and nearly all the metals except iron and those of equal or superior hardness, there seems a disposition to adhere, when, by accident, the recently removed shaving gets forcibly pressed against a recently exposed surface (the metals at the time being chemically clean). This disposition to unite is nearly prevented when water or other fluid is used.

Water is occasionally resorted to in turning wrought-iron and steel; this causes the work to be left somewhat smoother, but it is not generally used, as it is apt to rust the machinery; oil fulfils the same end, but is too expensive for general purposes.

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